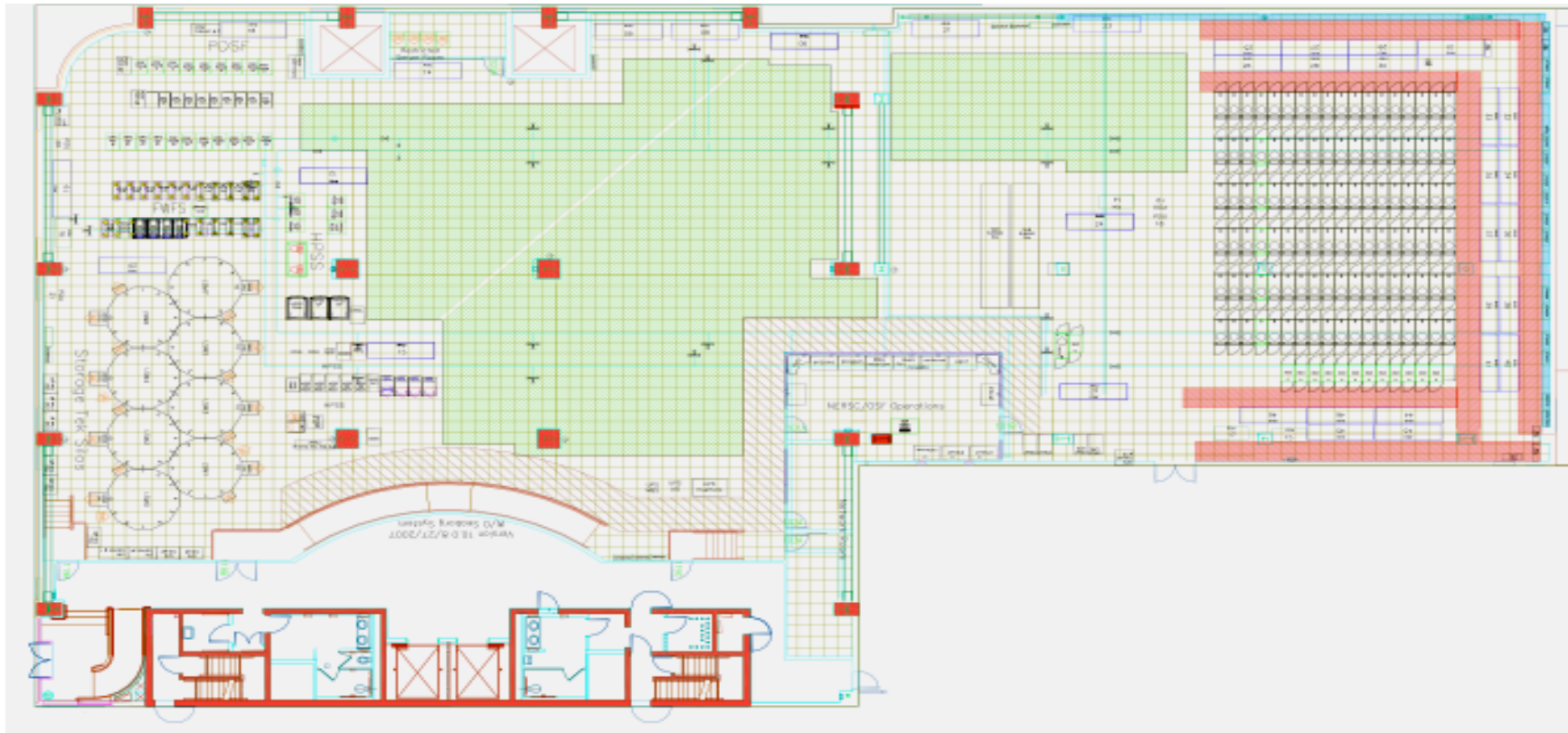


# ***Facility Integration***

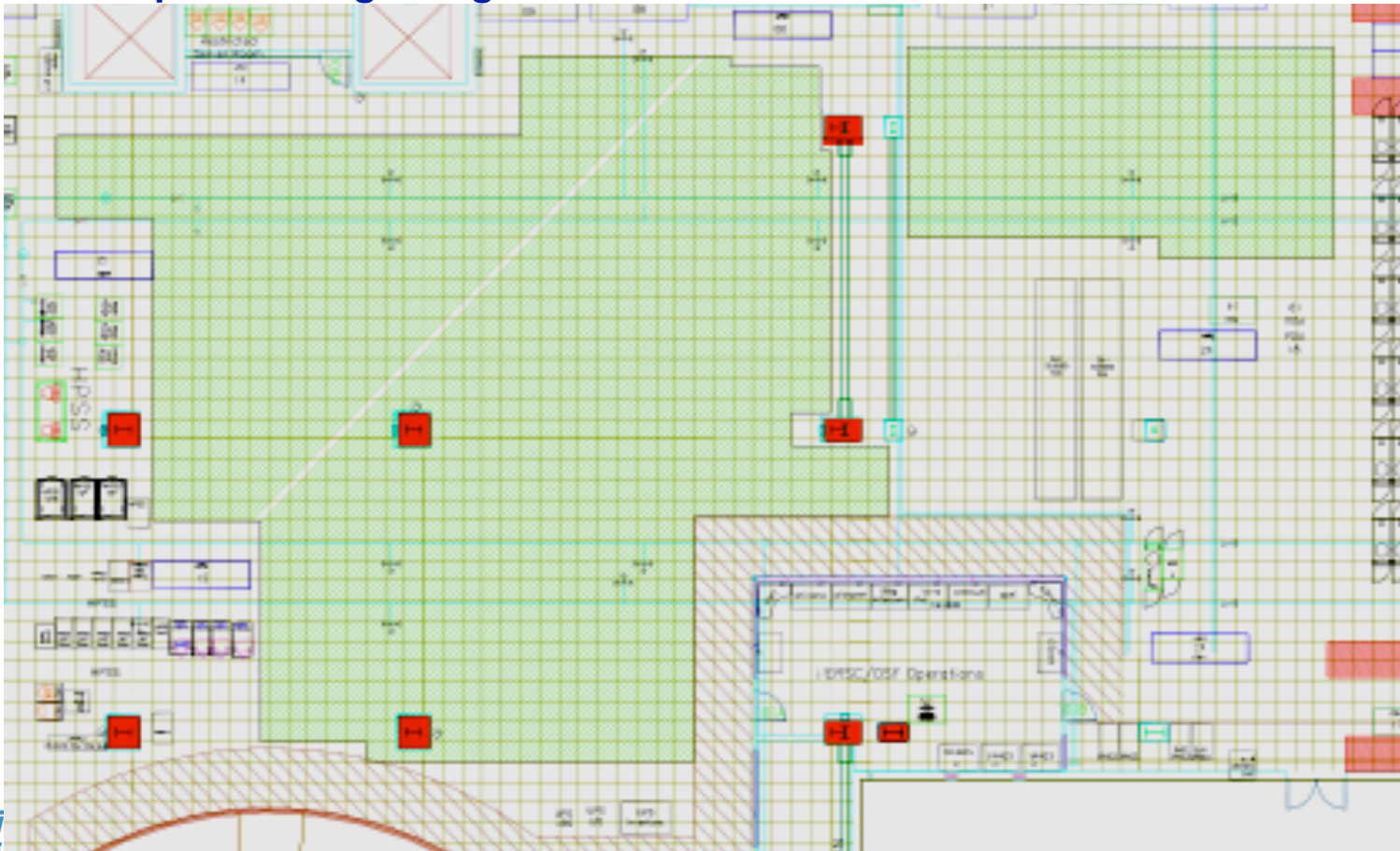
**July 2008**

# Oakland Scientific Facility Computer Room (19,000 sq ft)



# Flexible Cooling Capabilities

- NERSC-6 area 5,000 sq ft.
- OSF can support
  - Air cooling using chilled water Air Handling Units
  - Liquid cooling using direct chilled water connections



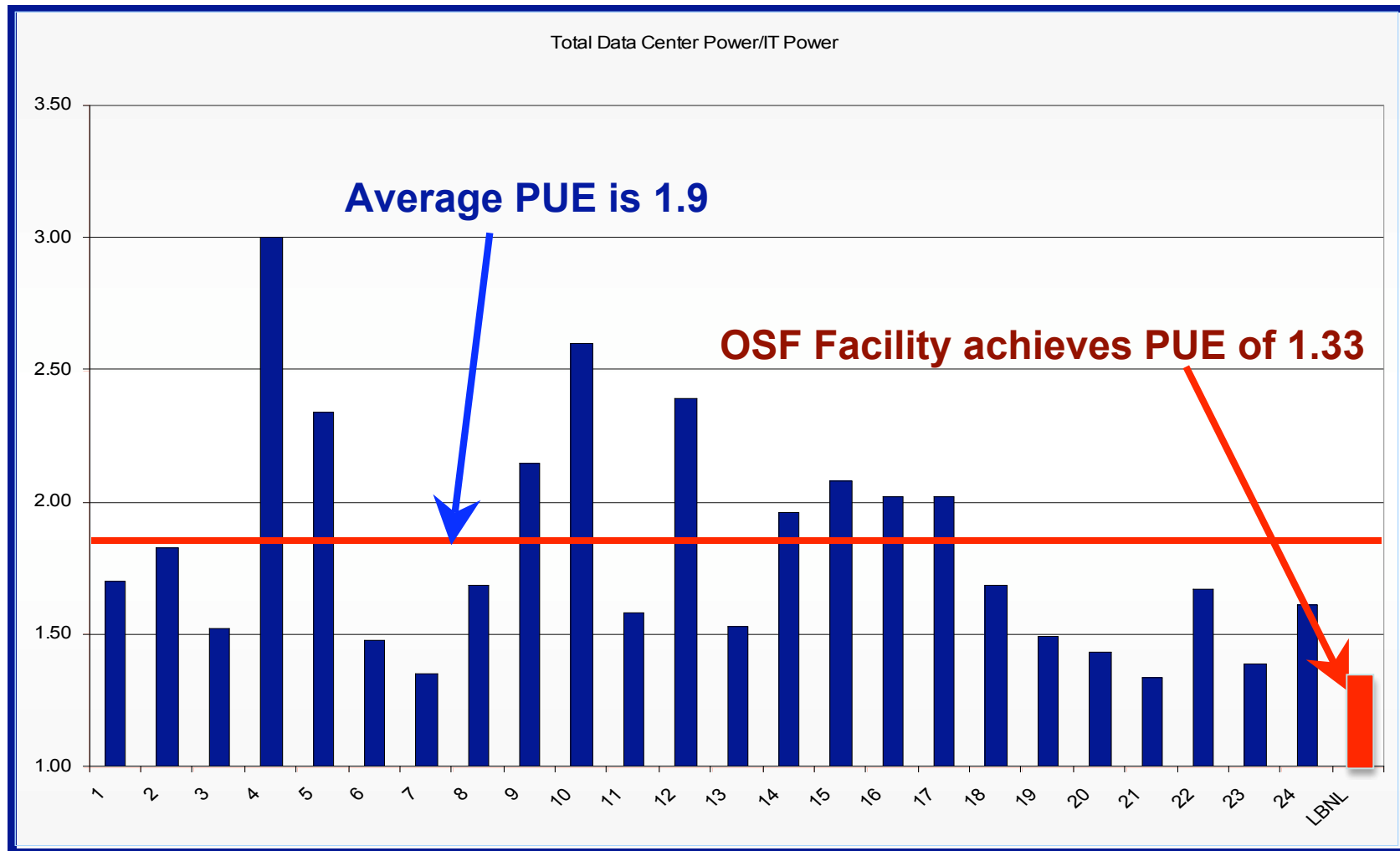
# Power and Cooling

	Power (including cooling)	Cooling
OSF	6MW	1450 tons
N6	3.3MW	700 tons

- Did major upgrade to facility power and cooling in 2005

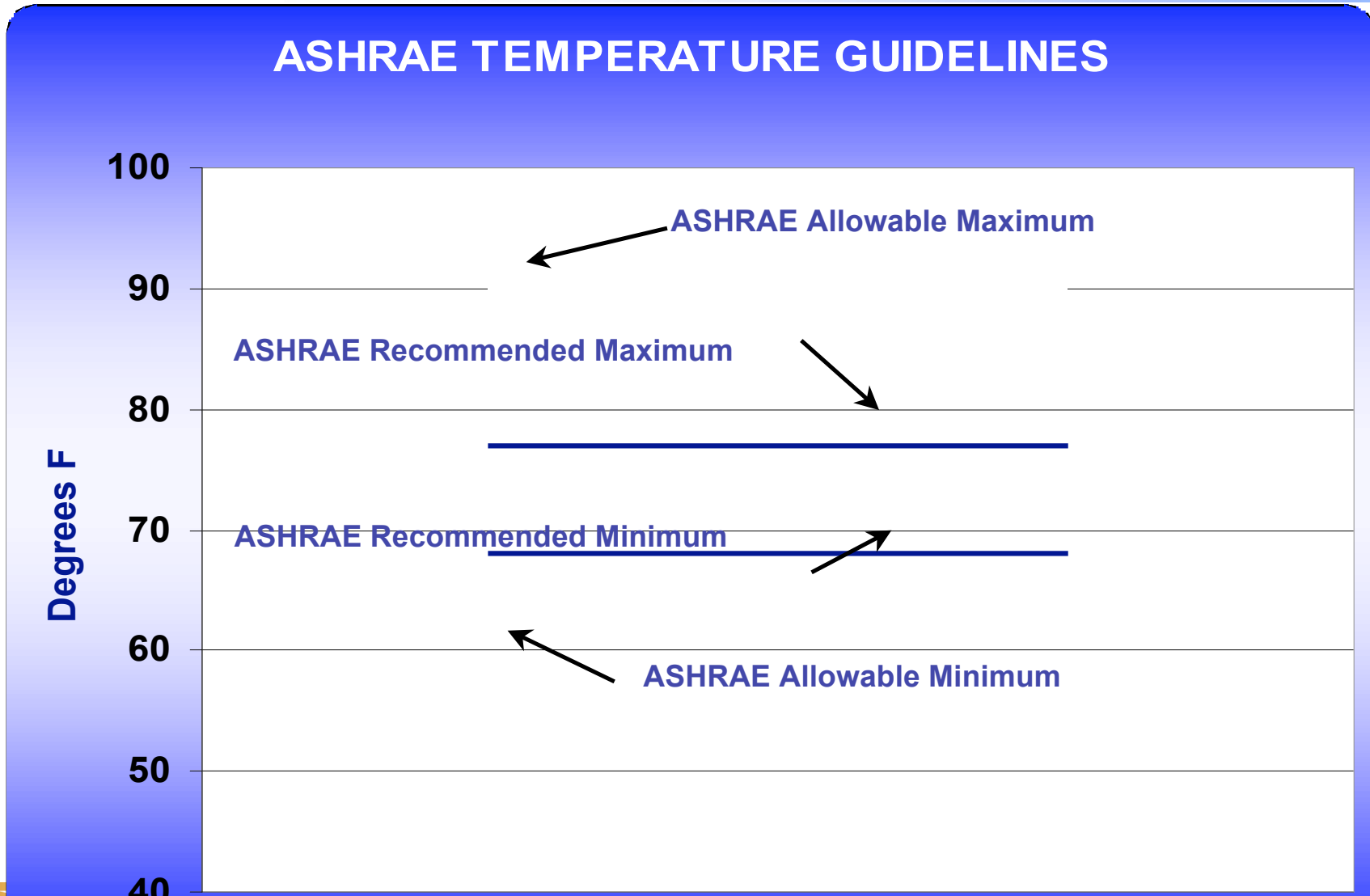
# Power Usage Effectiveness (PUE)

*OSF is a very efficient facility*



# ASHRAE Temperature Guidelines

*(opportunity to further improve cooling efficiency)*





# Power Efficiency for NERSC-6

- **Minimum Requirements**
  - < 3.3MW total power consumption with cooling
  - 480VAC 3-phase power for efficient distribution
- **Performance Features**
  - Operate at upper-end of ASHRAE allowable temperature range to improve cooling efficiency (PUE)
  - Consideration for other power-efficiency features (lower SSP/Watt and increased cooling efficiency)

# Seismic Protection

- **Work Safe Technologies: ISO-Base**





# System Delivery, Installation, and Integration

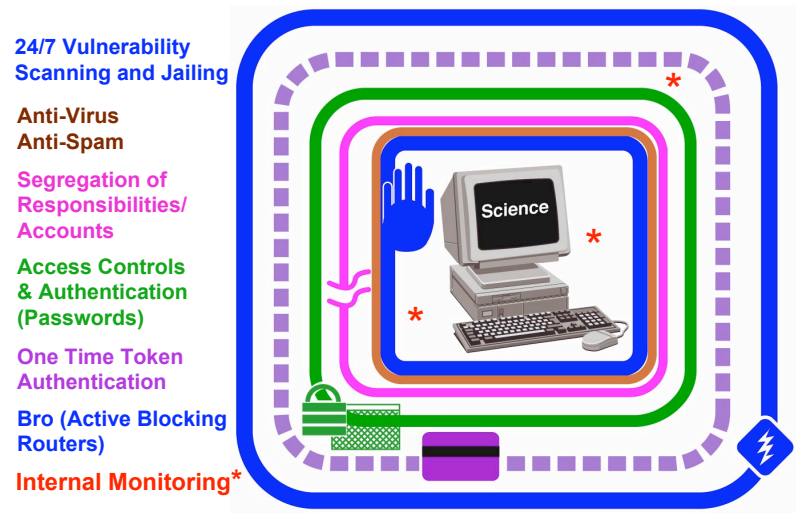
1. Test/development system delivered and installed
2. Formal factory test to assess readiness of system for shipment
  - Includes both functional and performance testing
3. System is installed, seismically protected, interconnect cabled
4. Vendor stabilizes system and initial performance testing takes place
5. System is configured for production and integrated with NERSC software infrastructure
6. Performance tuning to reach committed performance levels

# Software Integration

- **Center Infrastructure**
  - **Grid**
    - OSG software stack
  - **NIM**
    - Centralized account and allocation management
  - **HPSS Archive**
    - Hsi, htar, pftp
  - **LDAP**
    - OpenLDAP infrastructure for authentication
  - **Nagios**
    - Centralized system, fabric and storage monitoring
- **User Software environment**
  - **Batch scheduler configuration**
  - **User development environment**
    - Compilers
    - Debuggers
    - Profiling and performance analysis
  - **Libraries**
  - **Third-party applications**

# Security Integration

## Before general access :



- System is isolated from the outside and other systems
- System is examined and hardened
- System is scanned for vulnerabilities
- System receives DOE Authority to Operate

# Nagios Integration

- Nagios is an Open Source host, service and network monitoring program.
- Nagios customized for each system with plugins.
  - Monitors system health through polling services, eg ssh, ping
  - Plugins can process email messages, logs
  - Plugins for gathering and reporting system environmental health
  - Plugins to monitor the health of disk subsystems, network routers
- Nagios can interface with monitoring services provided by the vendor operating system.
- Integration time - 2 weeks